

Claims

1. A self-replicating recombinant vector comprising papilloma virus nucleotide sequences consisting essentially of

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- (i) a papilloma E1 gene and E2 gene,
- (ii) a minimal origin of replication of a papilloma virus
- (iii) a minichromosomal maintenance element of a papilloma virus,

and

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a heterologous nucleotide sequence encoding the HIV regulatory protein NEF, REV or TAT or an immunologically active fragment thereof.

2. A self-replicating vector of claim 1 wherein the papilloma virus is bovine papilloma virus (BPV).

3. A self-replicating vector of claim 1 ~~or 2~~ wherein the heterologous nucleotide sequence encodes the HIV-1 NEF protein.

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4. A self-replicating vector of ^{claim 1} ~~any of the preceding claims~~ wherein E1 is under the control of the sr α promoter or the thymidine kinase promoter.

5. A self-replicating vector of claim 4 which is pBNtkREV, pBNsr α TAT or pBNsr α NEF as shown in Figure 2, 3 or 4.

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6. A vaccine for DNA immunization against HIV comprising a self-replicating vector of ^{claim 1} ~~any of claims 1-5~~.

7. A vaccine of claim 6 comprising a mixture of vectors encoding different HIV regulatory proteins or immunologically active fragments thereof.

8. Method for preparing a self-replicating recombinant vector of ^{claim 1} ~~any~~ ~~of claims 1-5~~, said method comprising

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A) inserting a heterologous nucleotide sequence encoding the HIV regulatory protein NEF, REV or TAT or an immunologically active fragment thereof into a vector comprising papilloma virus nucleotide sequences consisting essentially of

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- (i) a papilloma E1 gene and E2 gene,
- (ii) a minimal origin of replication of a papilloma virus, and
- (iii) a minichromosomal maintenance element of a papilloma virus,

and

B) transforming a host cell with the resulting self-replicating recombinant vector,

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- C) culturing the host cell, and
- D) recovering said vector.

Sub. B3

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a

a

a

a

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9. The method of claim 8 wherein the host cell is an E. coli cell.

a 10. Use of a self-replicating vector of ^{claim 1} ~~any of claims 1-5~~ for the manufacture of a DNA immunization vaccine against HIV.

5 11. The use of claim 9 in the manufacture of a vaccine comprising a mixture of vectors encoding different HIV regulatory proteins or immunologically active fragments thereof.

Sub. B
a 12. Method of treating or preventing HIV comprising administering to a person in need thereof an effective amount of a self-replicating vector of ^{claim 1} ~~any of claims 1-5~~, and expressing the NEF, REV or TAT protein or an
10 immunologically active fragment thereof in said person.

13. The method of claim 12 comprising administering a mixture of vectors encoding different HIV regulatory proteins or immunologically active fragments thereof.

a 14. A host cell comprising the self-replicating vector of ^{claim 1} ~~any of claims 1-5~~
a 15 ~~1-5~~.

15. The host cell of claim 14, which is a bacterial cell or a mammalian cell.

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